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(71) Applicant: **YAMAICHI ELECTRIC CO., LTD.**
28-7, Nakamagome 3-chome
Ohta-ku, Tokyo(JP)

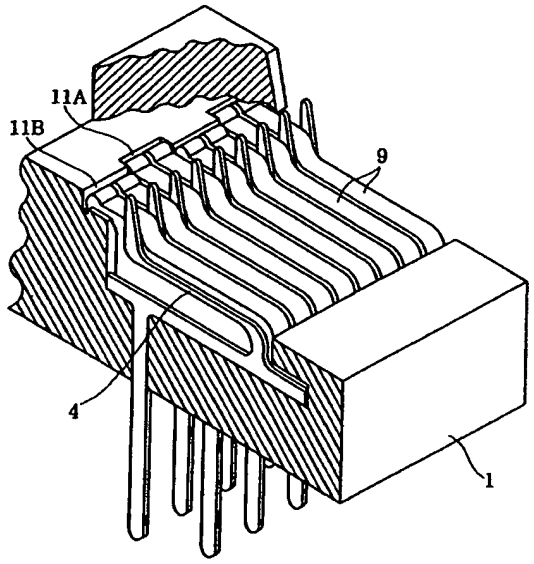
(72) Inventor: **Matsuoka, Noriyuki**
30-18-103, Kandaiji 2-chome, Kanagawa-ku
Yokohama-shi, Kanagawa-ken(JP)
Inventor: **Egawa, Masanori**
1-8-201, Gorin 2-chome, Miyagino-ku
Sendai-shi, Miyagi-ken(JP)

(74) Representative: **Ben-Nathan, Laurence Albert**
Urquhart-Dykes & Lord 91 Wimpole Street
London W1M 8AH(GB)

(54) Socket for the use of electric part.

(57) Partition walls 9 to be disposed between adjacent contacts are formed as a separate part from a socket board. One or both ends of the partition walls 9 are slip fitted into a socket board 1 or a platform 2 so as to be held by the socket board 1. The partition walls 9 and elastic contact elements 4c of the contacts 4 can be obediently displaced.

FIG.13



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BACKGROUND OF THE INVENTION

This invention relates to a socket used for measuring or mounting an electric part such as an IC, and more particularly to a construction of a partition wall disposed between adjacent contacts formed on the socket.

A socket of the type mentioned above has a plurality of contacts arranged at micro pitches so as to correspond to terminals of an IC. Therefore, the adjacent contacts must be isolated by a partition wall in order to prevent a short-circuit. In a conventional socket of this type, as shown in Fig. 16, the partition walls 2 are integrally formed on a socket board 1, and each of the contacts 3 is implanted between the adjacent partition walls 2.

Each of the partition walls is disposed in a very limited space between the adjacent IC terminals, and between the adjacent contacts, both being arranged at micro pitches. Since each of the partition walls requires, at each side thereof, a fine space just enough to avoid a friction with the adjacent contacts, it is obliged to be made extremely thin in wall thickness.

In recent years, there is a tendency that the IC terminals are arranged at narrower pitches, and therefore, each of the partition walls is required to be made thinner. However, since there is a limit in making the partition walls thinner, it becomes extremely difficult for the current molding technique to integrally form wholesome partition walls thin enough to meet with the aforementioned requirement.

As one solution for the above problem, it can be considered that each of the insulating partition walls is formed as a separate part from the socket board, and the partition wall is mounted on the socket board after the contacts are implanted in the socket board. However, because each of the partition walls is formed of a separate part, it becomes a problem whether a means for mounting the partition walls on the socket board is proper or not. For example, one idea, in which a plurality of holes for implanting the partition walls are formed in the socket board at micro pitches beforehand, is likewise hardly employable because it will accompany the same difficulties as in the very thin partition walls being arranged on the socket board at micro pitches.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a socket for the use of an electric part, in which each of partition walls is formed as a separate part from a socket board so that the partition walls can be made thin enough, and such obtained partition walls can be properly mounted on the socket board in order to function properly.

To achieve the above object, according to one aspect of the present invention, there is provided a socket for the use of an electric part, in which insulating partition walls are formed as a separate part from a socket board, and one end portions of the insulating partition walls are engaged with and held by the socket board.

From another aspect of the present invention, there is also provided a socket for the use of an electric part, in which insulating partition walls formed as a separate part from a socket board, and elastic contact pieces of the contacts to be contacted with terminals of the electric part under pressure and the partition walls are held by the socket board such that the elastic contact pieces and partition walls would be displaced obediently.

From a further aspect of the present invention, there is also provided a socket for the use of an electric part, in which unit partition walls having different lengths are formed, and one end portion of the partition wall unit having a long length and one end portion of the partition wall unit having a short length are alternately arranged in order to be engaged with corresponding separate groove units formed in the socket board so as to be held by the socket board.

From a still further aspect of the present invention, there is also provided a socket for the use of an electric part, in which the end portions of the unit partition walls having long and short lengths are slip fitted in an operating member, which is displaced obedient to the elastic contact pieces of the contacts, so as to be correctly positioned, and unit partition walls are displaced obedient to the operating member and the elastic contact pieces.

According to the present invention, each of the insulating partition walls, which is formed as a separate part from the socket body, is disposed between the adjacent contacts, and the ends of the partition walls are engaged with and held by the socket board. Owing to the foregoing arrangement, each of the partition walls can be properly held by the socket board without being implanted into the socket board under pressure.

Also, according to the present invention, the elastic contact pieces of the contacts to be contacted with the terminals of the electric part, and the partition walls are obediently displaced. Therefore, when the elastic contact pieces are displaced, the frictional resistance between the elastic contact pieces and the partition walls can be reduced. Furthermore, the elastic contact pieces and the partition walls can be positioned as close as possible with respect to each other, and therefore, the partition walls can be arranged at micro pitches, and also can be made thick in wall thickness. Moreover, an increase in displacement force of the

contacts caused by the frictional resistance with the partition wall can be prevented effectively.

Furthermore, according to the present invention, the partition walls are displaced obedient to the operating member which is displaced together with the elastic contact pieces of the contacts. Therefore, the obedient displacement can be obtained without fail.

In addition, according to the present invention, the unit partition walls in a group have different lengths. The unit partition walls having a long length and the unit partition walls having a short length are correctly positioned by the unit grooves having different phases formed either in the operating member or in the socket board. Therefore, a sideward displacement of the contacts due to accumulated errors can be prevented, and the partition walls and the elastic contact pieces can be arranged in proper position, so that they would be properly faced with the terminals of the electric part.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a socket for the use of an electric part according to one embodiment of the present invention;

Fig. 2 is a side view of the above socket but with a presser cover connected thereto;

Fig. 3 is a sectional view of the above, but showing a state where the contact is not yet brought into pressure contact with a terminal of the electric part;

Fig. 4 is likewise a sectional view of the above, but showing another state where the contact is in pressure contact with the terminal of the electric part;

Fig. 5 is a perspective view showing an important portion of the above socket by removing the partition walls therefrom;

Fig. 6 is a perspective view, partly cut-away, of the above socket, but with the partition walls mounted thereon;

Fig. 7 is a perspective view, partly cut-away, of an important portion of a socket according to another embodiment of the present invention;

Fig. 8 is a perspective view showing a modified partition wall unit according to the present invention;

Fig. 9 is a sectional view of the above socket, but showing a state where the above partition wall unit is mounted on the socket board and the terminals of the electric parts are not yet brought into pressure contacted with the contacts;

Fig. 10 is likewise a sectional view of the socket, but showing another state where the terminal of the electric part is in pressure contact with the contact;

Fig. 11 is a side view for explaining a displacement action of the elastic contact piece of the contact and the partition wall;

Fig. 12 is a perspective view of an important portion of a socket according to a further embodiment of the present invention, but with the partition walls removed therefrom;

Fig. 13 is likewise a perspective view of an important portion of the above socket, but with the partition walls mounted on the socket;

Fig. 14 is a sectional view of the above;

Fig. 15 is a sectional view of an important portion, showing a slip fitted state between a front end link portion of the partition wall and the front groove; and

Fig. 16 is a sectional view of an important portion showing an arrangement of partition walls and contacts according to the prior art.

DETAILED DESCRIPTION OF THE EMBODIMENTS

The present invention will now be described with reference to the embodiments shown in the accompanying drawings.

Figs. 1 through 6 shows a socket for the use of an electric part including an embodiment in which partition walls are displaceably held by a socket board, Fig. 7 shows a socket for the use of an electric part including another embodiment in which partition walls are displaceably held by the socket board, Figs. 8 through 10 show a socket for the use of an electric part including an embodiment in which a group of partition walls are made as a unit and held by the socket board, Fig. 11 shows an explanatory view for explaining the displacing actions of the partition walls and the contacts in the above embodiments, Figs. 12 through 15 show a socket for the use of an electric part including a further embodiment in which the partition walls are non-displaceably held by the socket body, and Fig. 16 shows a conventional socket for the use of an electric part in which there are shown a partition wall integrally formed on a socket body and a contact implanted in the socket body.

The embodiment shown in Figs. 1 through 6 will be described first.

The numeral 1 denotes a socket board formed of an insulator material. The socket board 1 has a space formed in a central portion thereof and adapted to receive an electric part therein. A rectangular electric part platform 2 is disposed in the electric part receiving space. A spring 3 for pushing up a lower surface of the electric part platform 2 is disposed between the platform 2 and the socket board 1. The platform 2 is displaceable downward while compressing the spring 3, and

displaced upwardly by a restoring force of the spring 3. A number of contacts are implanted in array along two sides or four sides of the electric part receiving space (that is, the electric part platform 2). Each of the contacts 4 has a male terminal 4a and is implanted into the socket board 1 through the male terminal 4a penetrating the socket board 1. Each of the contacts 4 also has a seat element 4b disposed at an upper end of the male terminal 4a and extending along the surface of the socket board 1. Each of the contacts 4 also has an elastic contact element 4c disposed at an upper position of the seat element 4b and extending toward the electric part platform 2 from the seat element 4b. A contact portion 4d projecting upwardly is formed by a free end of the elastic contact element 4c.

As shown in Figs. 2 and 3, the electric part 5 is placed on the platform 2 with a number of terminals 5a rested on the contact portion 4d of the elastic contact element 4c, and as shown in Fig. 4, the electric part 5 is pushed down together with the platform 2 while compressing the spring 3. As a result, each of the terminals 5a is urged against the elastic contact element 4c in order to displace the contact element 4c downward against elasticity thereof, and the contact portion 4d and the terminal 5a are brought into pressure contact with each other by its restoring force.

The socket board 1 is provided with a presser cover 6 as a means for pushing or urging against the contact portion 4c of the terminal 5a. One end of the presser cover 6 is pivotally supported by one end of the socket board 1 so that the cover 6 can be opened and closed, and the other end of the presser cover 6, in turn, pivotally supports a lock lever 7. When the presser cover 6 is closed on the socket board 1, the lock lever 7 is retained at the other end of the socket board 1 in order to maintain the closed condition. During the time when the presser cover 6 is closed on the socket board 1, the terminals 5a of the electric part 5 are urged against the contact portions 4d of the elastic contact elements 4c by a pillow-like pad 8 formed on and slightly projected from an inner surface of the presser cover 6 in order to hold the electric part 5 and to maintain the above pressure contact relation. When this presser cover 6 is released, the platform 2 is restored to an upper position by the restoring force of the spring 3, thereby removing the pressure contact relation between the terminals 5a and the contacts 4. As a result, the electric part 5 can be removed from the socket.

The numeral 9 denotes insulating partition walls each of which is disposed between the adjacent contact elements 4c. The partition walls are formed as a separate part from the socket board 1, and individually separately formed as shown in Fig. 5. Alternatively, as shown in Fig. 8, a group of partition walls 9 may be connected with each other at one ends thereof as will be described later. Although not shown, one ends of the unit partition walls 9 may be connected with each other.

Each of the insulating partition walls 9 has a contact element isolating portion 9a disposed along each of the elastic contact elements 4c of the contacts 4, and a contact isolating portion 9b rising along each of the contact portions 4d. The partition wall 9 has link portions 9c and 9d at both ends (rear end and front end) thereof. Each of the link portions 9c and 9d has an arcuate portion on its outer surface in order to enhance a smooth sliding pivotal movement thereof. As discussed above, the insulating partition walls 9 are mounted such that each of the insulating partition walls would be located between the adjacent elastic contact elements 4c, and the rear link portions 9c are pivotably slip fitted into corresponding grooves 10 arranged in the direction of the contact array, and the front link portions 9d are likewise pivotably slip fitted into corresponding grooves 11 formed in a peripheral portion of the platform 2 and arranged in the direction of the contact array, thereby disposing the partition walls 9 across the link portions 9c and 9d, so that each of the partition walls 9 would be located between the adjacent elastic contact elements 4c.

Owing to the foregoing arrangement, as shown in Fig. 11, each of the partition walls 9 is held by the socket board 1 such that the partition wall 9 can be pivotally displaced upwardly and downwardly about the rear link portion 9c as a stationary fulcrum P_1 and also about the front link portion 9d as a floating fulcrum P_2. Therefore, the link portions 9c and 9d form joint portions of the partition wall 9.

More specifically, when the platform 2 is displaced downwardly while compressing the spring 3, the front link portion 9d of the partition wall 9 is also pushed downwardly and pivotally displaced about the rear link portion 9c as a stationary fulcrum. At the same time, the contact portion 4d is pushed downward by the terminal 5a of the electric part 5a, thereby flexing the elastic contact element 4c downwardly. As a result, the partition wall 9 is displaced downwardly obedient to the downward displacement of the elastic contact element 4c. The term "obedient" does not refer to a complete synchronism but includes a modified embodiment, in which a small gap exits between the downward displacement and the upward displacement of the partition wall 9 and elastic contact element 4c of the contact 4.

As shown in Figs. 3, 6, 11, etc., a front end portion of the contact portion 4d of the contact 4 is slightly projected upwardly of the contact isolating

portion 9b of the partition wall 9 so that the terminal 5a of the electric part can be placed thereon for contacting. However, the elastic contact element 4c of the contact 4 and the partition wall 9 are obediently displaced downwardly as mentioned, and therefore, the projecting amount of the contact portion 4d can be reduced as much as possible. As a result, there can be obtained a sufficient amount of downward displacement by the small projecting amount of the contact portion 4d, thus enabling to obtain a contact pressure, too.

Since the projecting amount of the contact portion 4d can be reduced as much as possible, the intended object (that is, insulation) to be achieved by a provision of the partition wall can be obtained effectively. Also, owing to the obedient displacement of the partition wall 9 and the elastic contact element 4c, the friction therebetween can be minimized.

By mounting the link portions 9c and 9d of the partition wall 9 afterward, a partition wall holding plate 12 capable of releasing the rear groove 10 is formed, and by mounting the partition wall holding plate 12 on the socket board 1, the rear groove 10 is formed. The platform 2 is of a two-plate overlapping construction consisting of a lower plate, i.e., base plate 2a, and an upper plate, i.e., partition wall holding plate 2b. By overlapping the two plates 2a and 2b, the front groove 11 is formed in marginal portions of thereof.

For mounting the partition walls 9 on the socket board 1 as shown in Fig. 5, first, the contacts 4 are implanted in the socket board 1 in an array. Then, as shown in Fig. 6, each of the partition walls 9 is disposed between the contacts 4 (i.e., elastic contact elements 4c), and the link portions 9c and 9d are inserted into the grooves 10 and 11. Thereafter, the partition wall holding plates 12 and 2b are mounted to hold the partition walls 9.

Figs. 1 through 4 clearly show one example of the present invention, in which the front link portions 9d of the partition walls 9 are engaged with the platform 2. In contrast, Figs. 5 through 7 show, besides the platform 2, an operating member which is capable of moving upward and downward. The present invention includes a modified embodiment, in which the grooves 11 are formed in the operating member, and the front link portions 9d of the partition walls 9 are slip fitted into these grooves 11.

More specifically, in Figs. 1 through 4, the platform 2 functions as a means for placing the electric part 5 thereon on the one hand, and it functions as the operating member for displacing the partition walls 9 upwardly and downwardly on the other hand. A socket, which is not provided with the platform 2, may be provided with the operating member. In this case, for example, the operating member is formed in a two-plate overlapping construction consisting of the base plate 2a and the partition wall holding plate 2b, and the grooves 11 are formed in the upper surface thereof, so that the front link portions 9d of the partition walls 9 can be slip fitted in the grooves 11.

Fig. 7 shows another example of the present invention, in which the front ends of the partition walls 9 in one group are arranged in the same length, and slip fitted in the grooves 11. In contrast, Figs. 5 and 6 show a positioning means for preventing a sideward displacement of the group of insulating partition walls 9. As illustrated, the unit partition walls 9 in one group have different lengths, and the unit partition walls having a long length and the unit partition walls having a short length are alternately arranged. The unit partition walls having a long length and a short length are slip fitted in unit grooves 11A and 11B having different phases formed in the upper surface of the platform 2 or of the operating member. In this embodiment, the partition walls have two kinds of different lengths.

In this way, the unit partition walls 9 in one group are engaged in the corresponding unit grooves 11A and 11B, so that the outer sides or faces of the unit partition walls 9A and 9B are regulated by the inner sides or faces of the grooves 11A and 11B. As a result, the partition walls can be positioned per unit partition wall. Therefore, the sideward displacement caused by difference in accumulated errors of the whole partition walls 9 or the sideward displacement, when in use, can be removed. More specifically, if there is a difference in manufacturing error (for example, error in thickness) in the partition walls 9, these errors are accumulated to cause the side walls 9 and the elastic contact elements 4c of the contacts 4 to be displaced sideward, or the link portions 9c are displaced sideward when in use. As a result, there is a fear that a proper contact with the terminal 5a is unobtainable.

The invention relating to the positioning of the partition walls is capable of effecting a correct positioning without changing the individual pitches of the adjacent partition walls 9. Thus, the above problems can be solved effectively. The rear ends of the unit partition walls 9A and 9B can be integrally connected with each other per unit partition wall. Of course, the rear ends of the whole partition walls can be connected with each other, as shown in Fig. 8.

Figs. 8 through 10 show a further embodiment, in which the groups of partition walls 9 are connected with each other per each array. More specifically, the rear ends of the group of partition walls 9 in each array are connected to form a partition wall unit 9' by an integral molding. This

partition wall unit (that is, unit consisting of one group of partition walls in each array) is mounted on the socket board 1 such that each of the partition walls would be located between the adjacent contacts 4. This partition wall unit may be disposed across the socket board 1 and the platform 2 or operating member, as in the embodiments of Figs. 1 through 7.

In Figs. 9 and 10, the partition wall unit 9' is not connected to the operating member, but slip fitted into the grooves 10 on the side of the socket board 1, so that each of the partition walls would be located between the adjacent contacts. In this case, as shown in Fig. 8, a spring bearing portion 13 is disposed at each side (right and left) of the partition wall unit 9', and the spring bearing portion 13 is resiliently held by a spring 14, so that the partition wall unit 9' can be displaced downward obedient to the contacts while compressing the springs 14, and restored to an upper position by restoring forces of the springs 14.

With reference to the means for restoring the individual partition walls 9 or partition wall unit 9', the elastic contact pieces 4c of the contacts 4 may be connected to the partition walls 9 or partition wall unit 9', so that the partition walls 9 or partition unit 9' would be restored to the upper position, without the use of the springs 3. For example, by means of a provision of a means for retaining the individually separated partition walls 9 or integrated partition wall unit 9' on the upper surfaces of the elastic contact elements 4c, the partition walls 9 or partition wall unit 9' can be displaced downwardly by own gravity thereof and upwardly by the restoring forces of the elastic contact elements 4c.

In the embodiment of Figs. 9 and 10, the partition wall unit 9' is displaced, as one group, upwardly by the springs 14, and is displaced, as one group, downwardly against the springs 14.

The partition wall unit 9' is pushed downward at the same time when the electric part 5 is pushed downward. For example, according to this embodiment, the presser cover 6 is provided with a presser pad 8 adapted to push down the terminals 5a of the electric part 5, and a push-down portion 15 adapted to push down the partition wall unit 9', so that when the presser cover 6 is closed on the socket board 1, the terminals 5a of the electric part 5 and the spring bearing portion and pressure receiving portion (that is, portion having both functions; one is a spring bearing function and the other is a pressure receiving function) 13 would be pushed down simultaneously. The above presser cover 6 is merely one example, and other means, such as a robot at the site, may, of course, be used as the press-down means.

Figs. 12 through 15 show a still further embodiment, in which the partition walls 9 are not connected to the operating member such as the platform 2, but they are held by the socket board 1.

More specifically, as mentioned above, each of the partition walls 9 is provided at each end there of with the rear link portion 9c and the front link portion 9d. On the other hand, the socket board 1 is provided at a rear portion of its space for implanting the contacts with rear grooves 10 in the direction of the contact array, and at a front portion of its space with front grooves 11 likewise in the direction of the contact array, so that the front link portions 9d would be engaged in the front grooves 11 and the rear link portions 9c would be engaged in the rear grooves 10.

In the above embodiment, each of the partition walls 9, which are formed as a separate part, is disposed between the adjacent contacts 4, and one or the both ends thereof is engaged with the socket board 1, so that the partition wall can be properly held by the socket board 1 without being implanted therein. Further, in the above embodiment, as in the embodiment of Figs. 2 through 6, the group of insulating partition walls 9 have different lengths per unit partition wall, and one ends of the unit partition walls 9A having a long length and one ends of the unit partition walls 9B having a short length are alternately arranged, so that they would be engaged in the units grooves 11A and 11B having different phases, thereby positioning the partition walls per each unit wall.

According to the present invention, the partition walls, which are formed as a separate part from the socket board, can be properly held by the socket board without being implanted therein. In other words, it is no more required to form the holes for press fitting the partition walls therein beforehand. Therefore, the partition walls can be formed as a separate part with ease, and the intended micro pitches can be attained effectively.

Also, according to the present invention, by displacing the partition walls obedient to the elastic contact elements of the contacts, the frictional resistance between each of the partition walls and the adjacent contacts can be reduced at the time when the elastic contact elements are displaced, thus enabling to displace the group of contacts downwardly by a reduced push-down force. Moreover, by displacing the partition walls obedient to the elastic contact elements of the contacts, the projecting amount or dimension of the contact portion of each of the elastic contact elements projecting from each of the partition walls can be minimized. Therefore, the contacts can be effectively insulated by the partition walls.

Furthermore, even if the projecting dimension of the contact portion is minimized, a sufficient displacing amount can be obtained. Therefore, the proper contact pressure between the terminals of

the electric part and the contact portions of the contacts can be obtained, and the partition walls can be located closer to the sides of the elastic contact elements, thus enabling to increase the thickness of the partition walls and to attain the micro pitches. In addition, by arranging the partition walls and the elastic contact pieces in proximate relation, the sideward play of the elastic contact elements between the adjacent partition walls can be prevented effectively, thus enhancing the positioning effect of the contacts by the partition walls.

Furthermore, according to the present invention, the group of partition walls have different lengths per each unit partition wall, and the unit partition walls having a long length and the unit partition walls having a short length are positioned in unit grooves having different phases formed in the operating member or socket board. Therefore, the sideward displacement of the contacts due to accumulated sideward errors of the group of partition walls can be prevented effectively, and each of the partition walls and each of the elastic contact elements can be arranged in proper positions. As a result, the elastic contact elements of the contacts can be properly faced with the terminals of the electric part.

Moreover, there can be effectively obviated such inconvenience as that the partition walls, which are formed as a separate part, are displaced sidewardly in use to cause the elastic contact elements o the contacts to be displaced sidewardly.

Claims

1. A socket for the use of an electric part having a plurality of contacts implanted, in array, in an upper surface of a socket board formed of an insulator material, said contacts being isolated by insulating partition walls, wherein said insulating partition walls are formed as a separate part from said socket board, each of said partition walls being disposed between the adjacent contacts, said insulating partition walls being engaged at one ends thereof with and held by said socket board.

2. A socket for the use of an electric part having a plurality of contacts implanted, in array, in an upper surface of a socket board formed of an insulator material, said contacts being isolated by insulating partition walls, wherein said insulating partition walls are formed as a separate part from said socket board, each of said partition walls being disposed between the adjacent contacts, said insulating partition walls being held by said socket board such that said insulating partition walls and elastic contact elements of said contacts to be pressure contacted with terminals of said electric part are obediently displaced.

3. A socket for the use of an electric part having a plurality of contacts implanted, in array, in an upper surface of a socket board formed of an insulator material, said contacts being isolated by insulating partition walls, wherein said insulating partition walls are formed as a separate part from said socket board, each of said partition walls being disposed between the adjacent contacts, said socket further comprising an operating member which is obediently displaced downward when said terminals of said electric part push down said elastic contact elements of said contacts, one ends of said insulating partition walls being slip fitted in said operating member, said insulating partition walls being held by said socket board such that said partition walls would be displaced obedient to said operating member or said elastic contact elements.

4. A socket for the use of an electric part having a plurality of contacts implanted, in array, in an upper surface of a socket board formed of an insulator material, said contacts being isolated by insulating partition walls, wherein said insulating partition walls are formed as a separate part from said socket board and disposed between the adjacent contacts, said insulating partition walls having different lengths per each unit partition wall, one end portions of said unit partition walls having a long length and one end portions of said unit partition walls having a short length being alternately arranged so that they would be slip fitted in unit grooves having different phases formed in an upper surface of said socket board.

5. A socket for the use of an electric part having a plurality of contacts implanted, in array, in an upper surface of a socket board formed of an insulator material, said contacts being isolated by insulating partition walls, wherein said insulating partition walls are formed as a separate part from said socket board, each of said insulating partition walls being disposed between the adjacent contacts, said socket further comprising an operating member which is obediently displaced downward when said terminals of said electric part push down said elastic contact elements of said contacts, said insulating partition walls having different lengths per each unit partition wall, one end portions of said unit partition walls having a long length and one end portions of said unit partition walls having a short length being al-

ternately arranged so that they would be slip fitted in unit grooves having different phases formed in said operating member, said insulating partition walls being held by said socket board such that said partition walls would be displaced obedient to said operating member.

6. A socket for the use of an electric part as claimed in claim 1, 2, 3, 4 or 5, wherein a whole of a group of said partition walls are connected at one ends thereof, or one ends of a group of said partition walls are connected per each unit partition wall.

FIG. 1

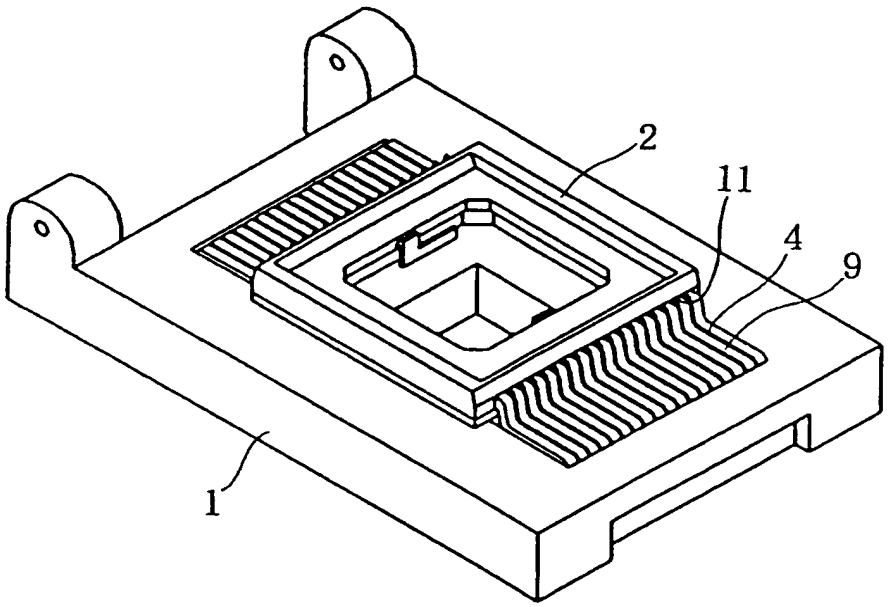


FIG. 2

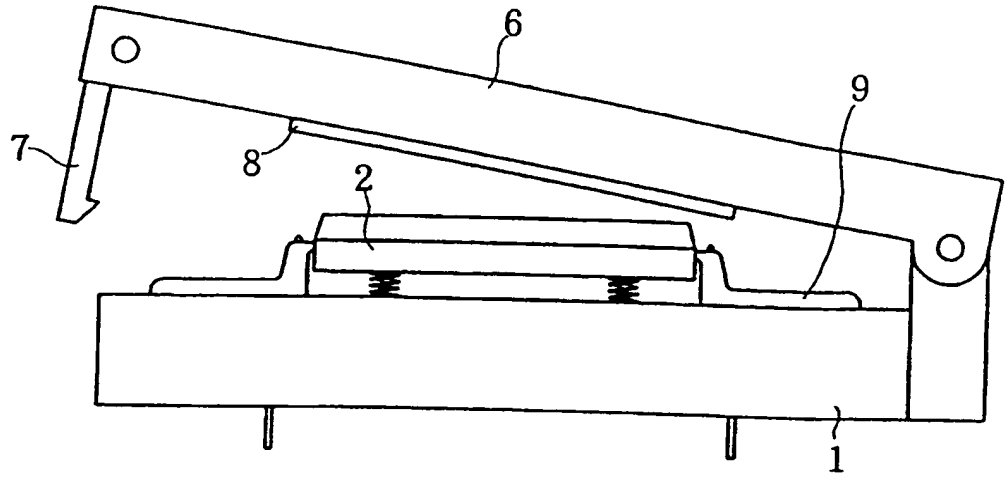


FIG. 3

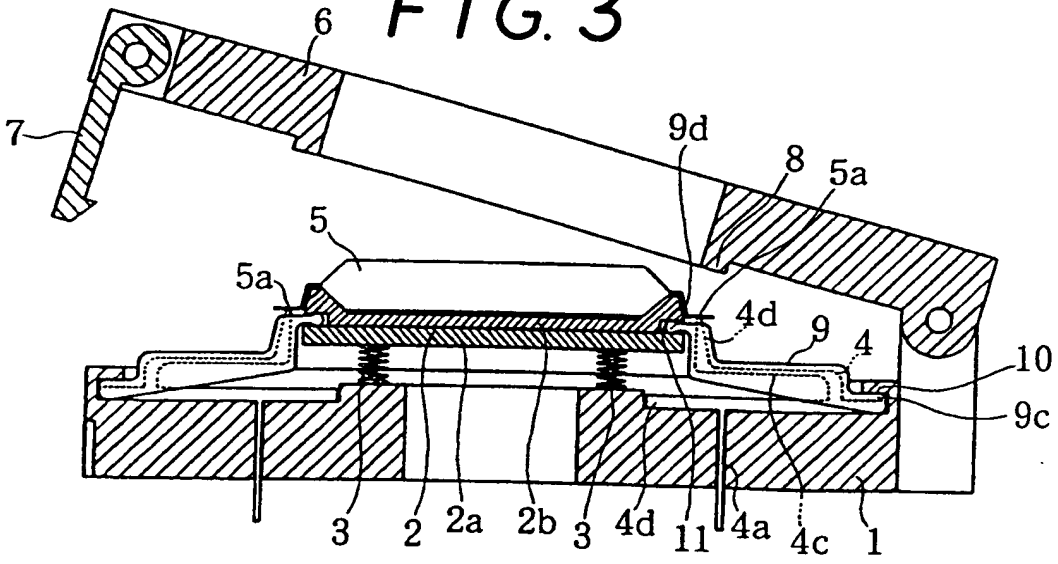


FIG. 4

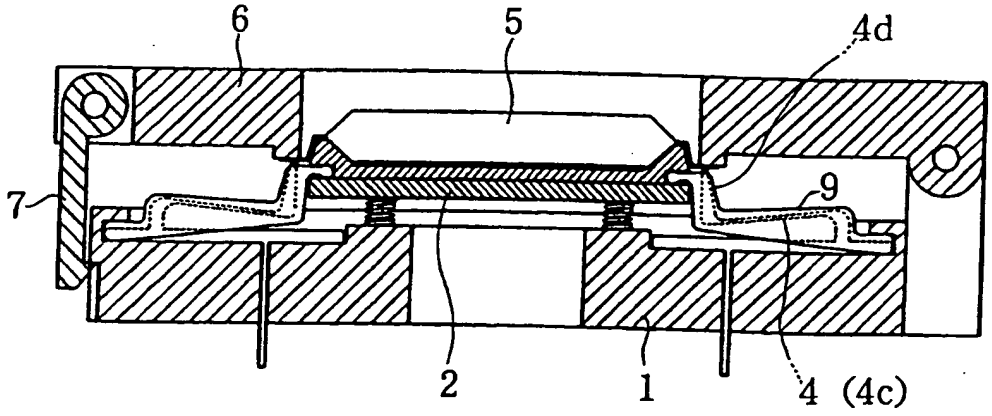


FIG. 5

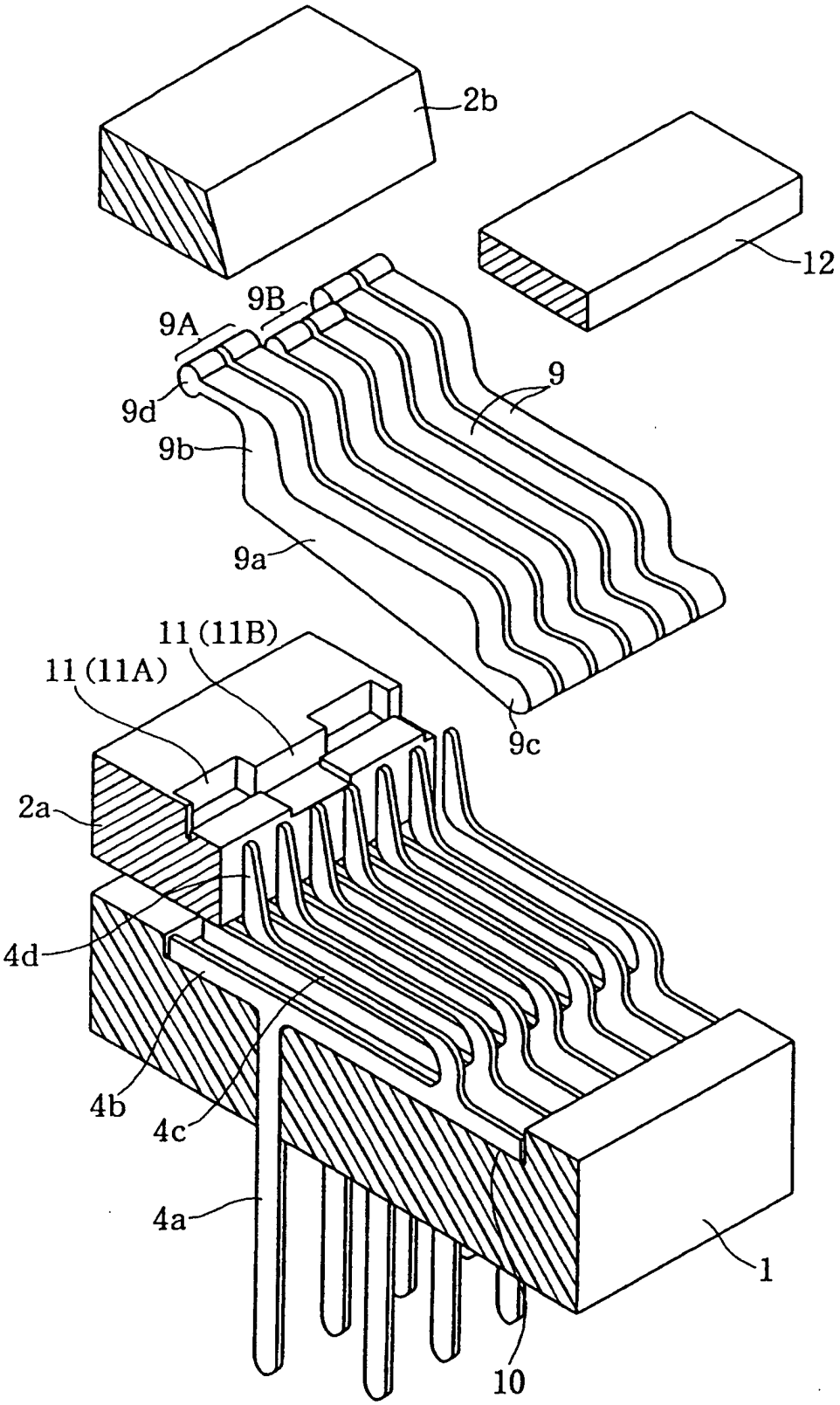


FIG. 6

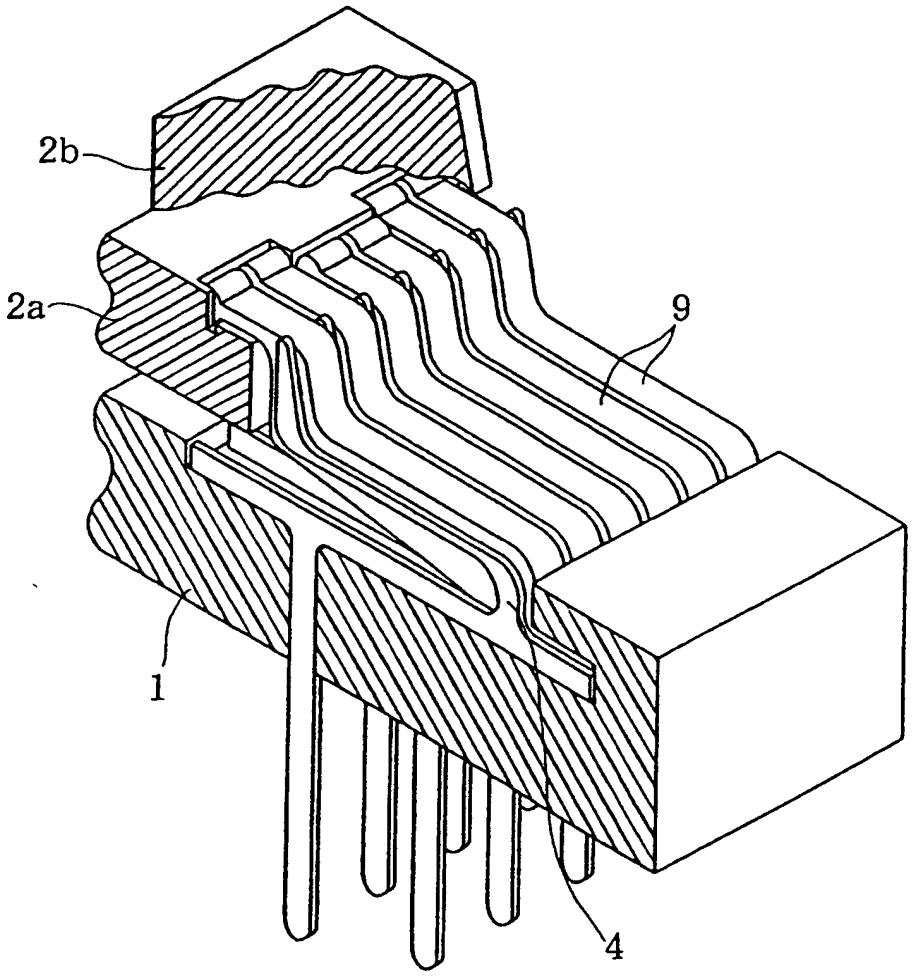


FIG. 7

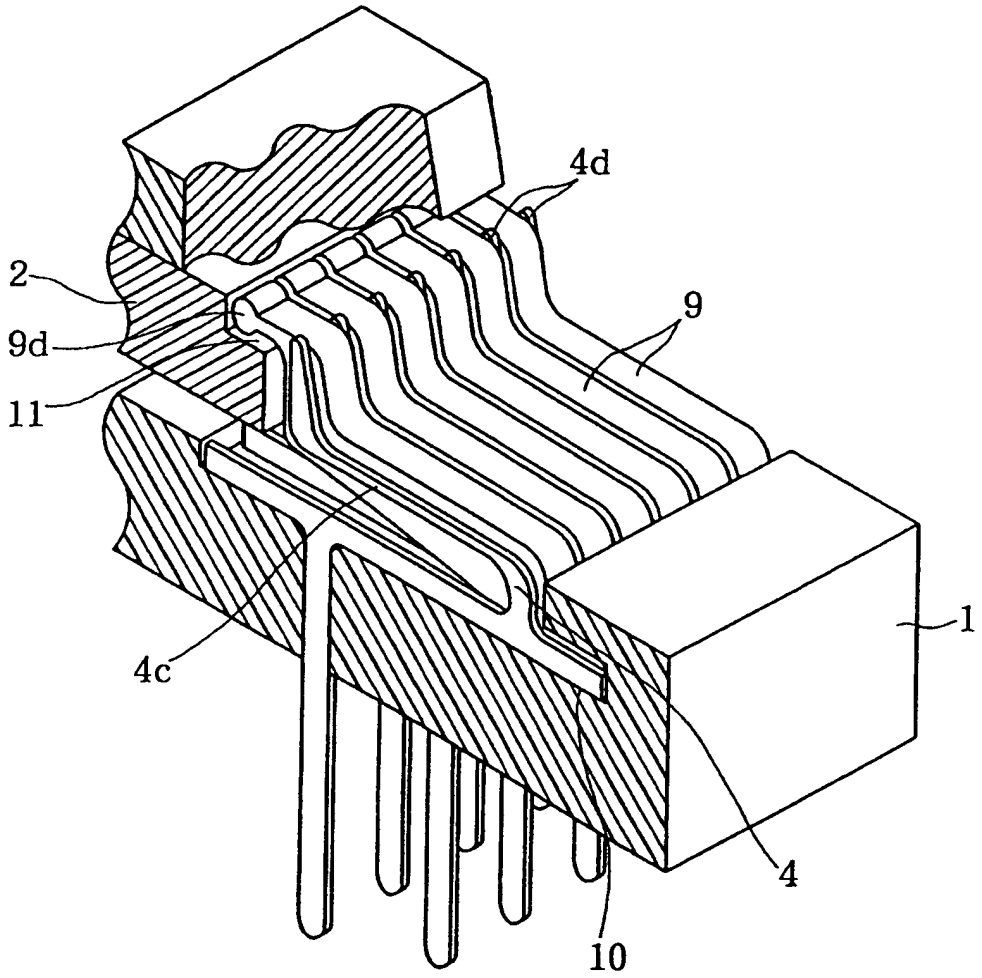


FIG. 8

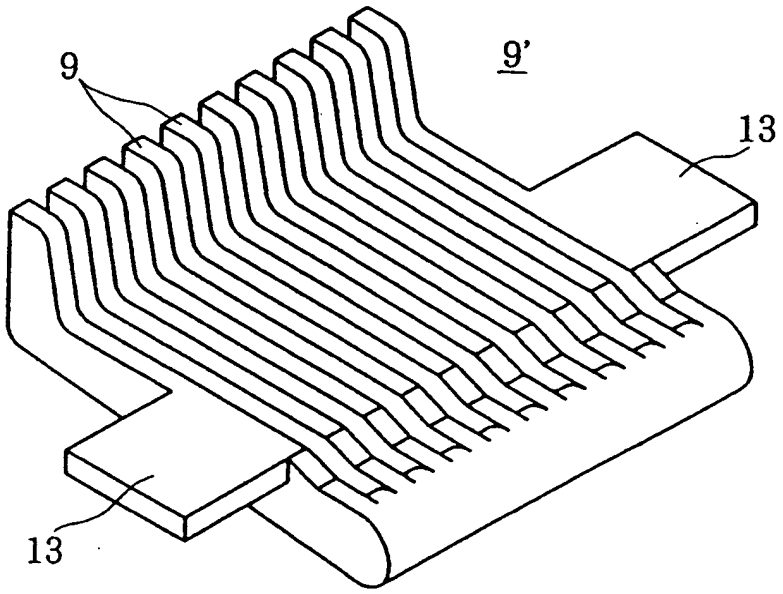


FIG. 9

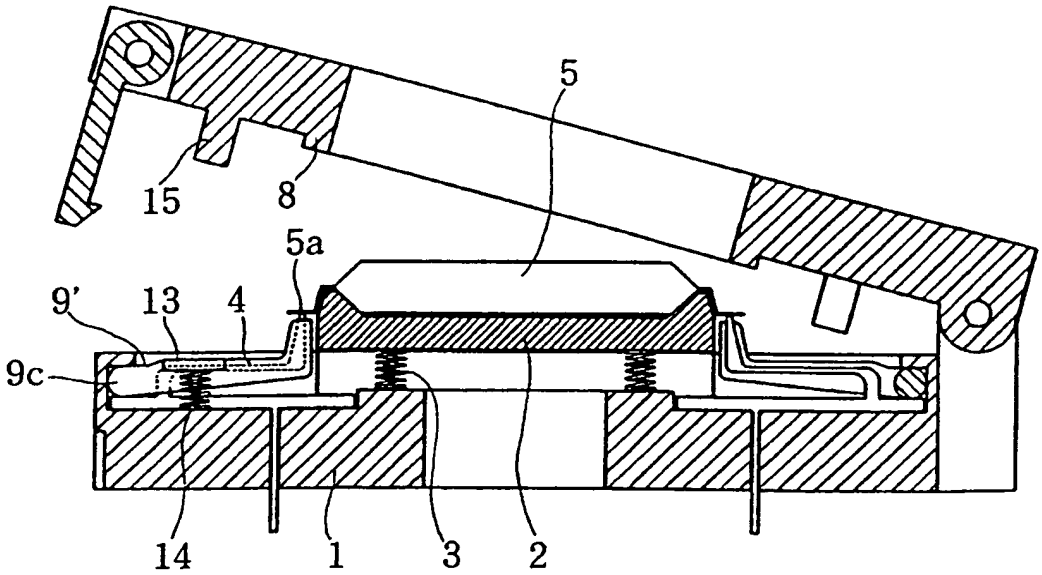


FIG. 10

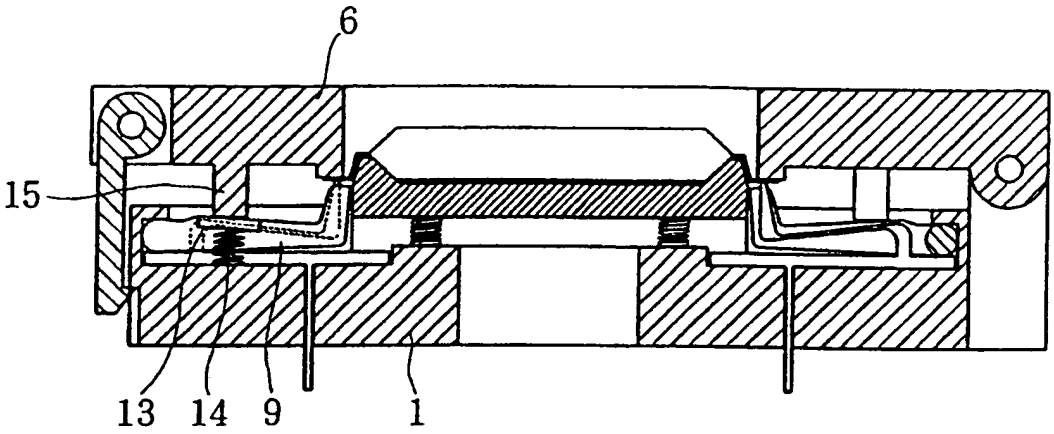


FIG. 11

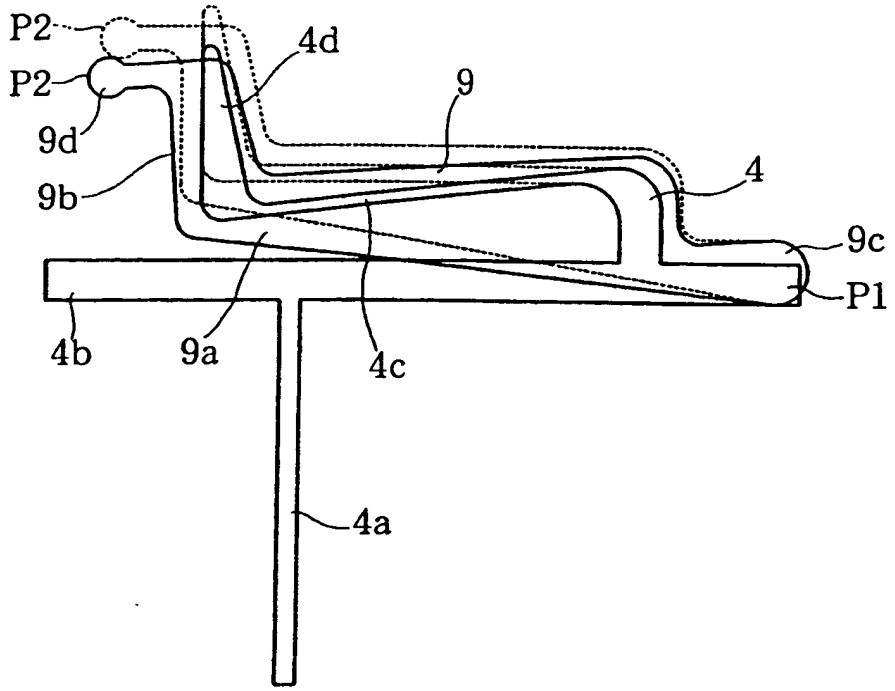


FIG.12

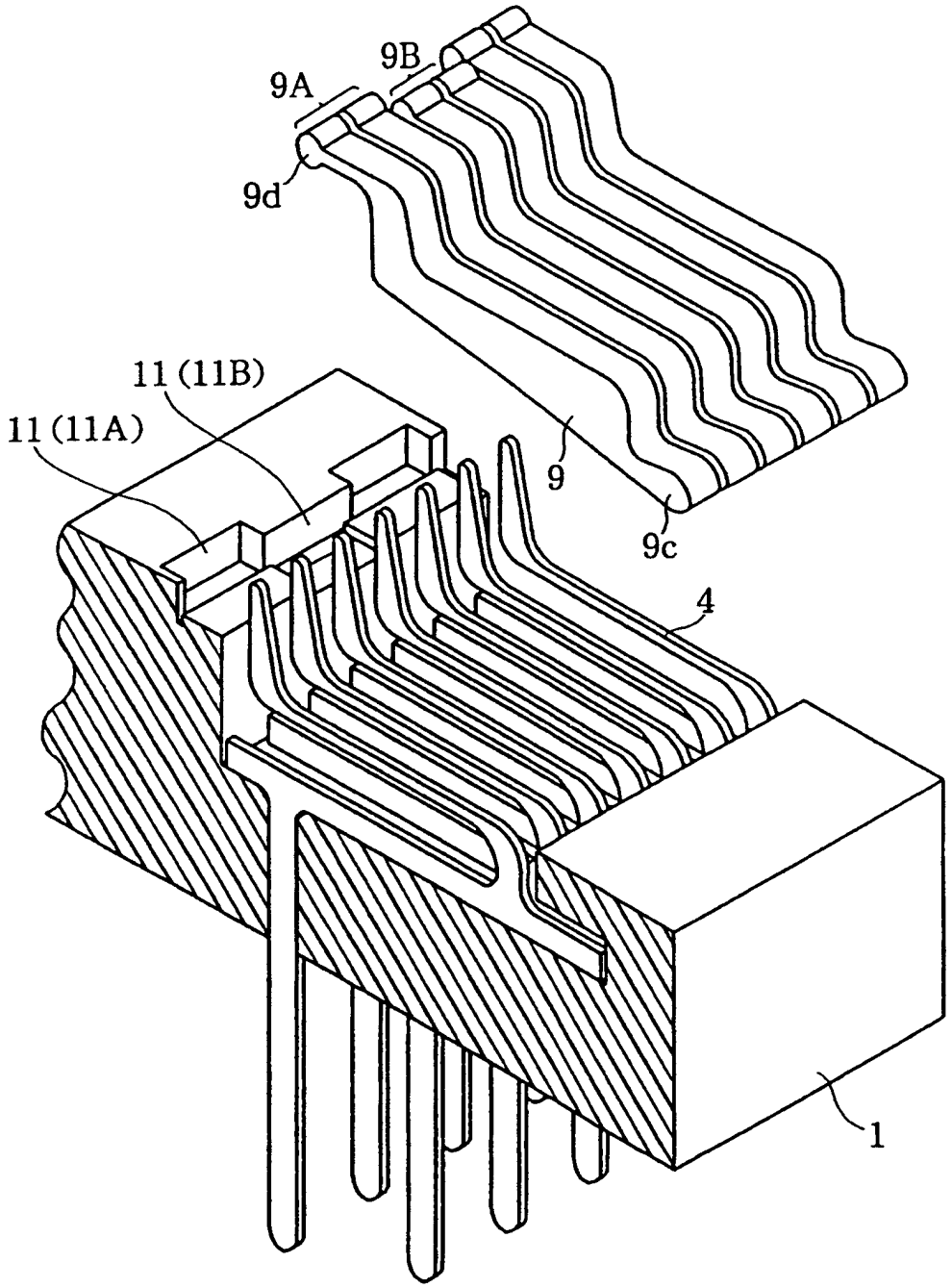


FIG.13

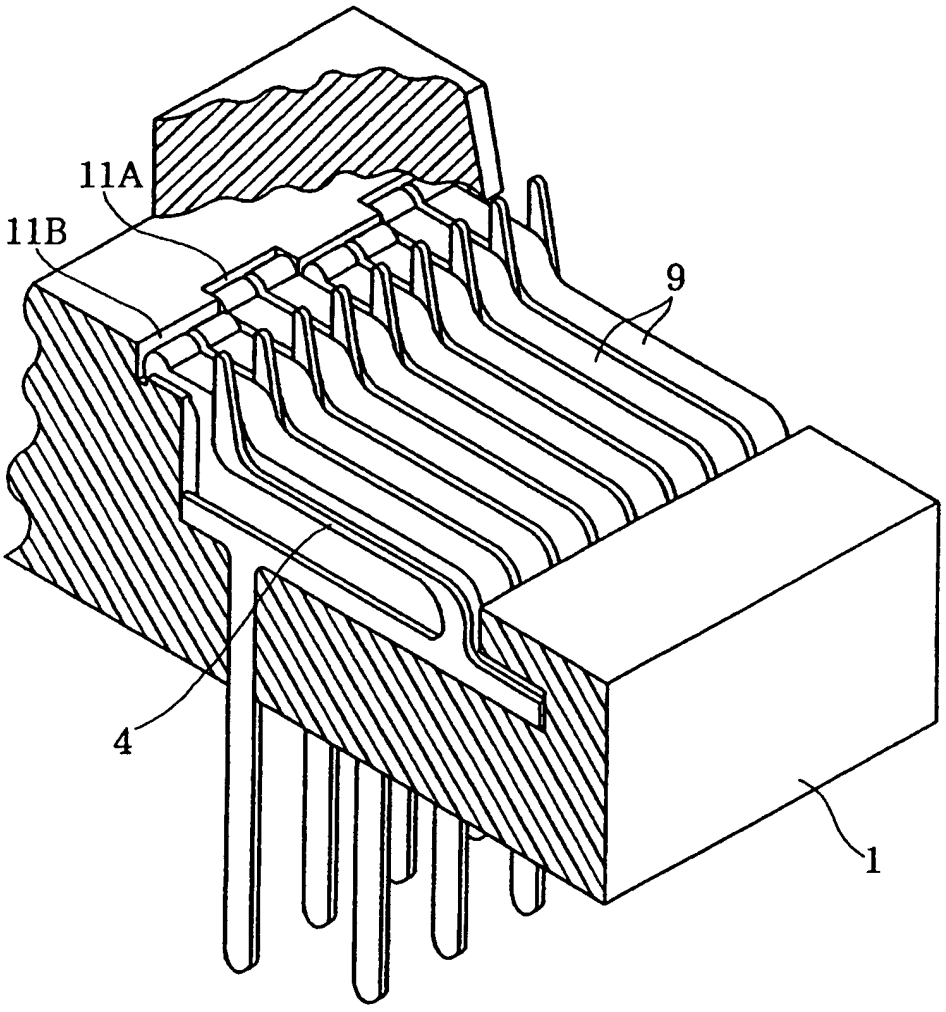


FIG.14

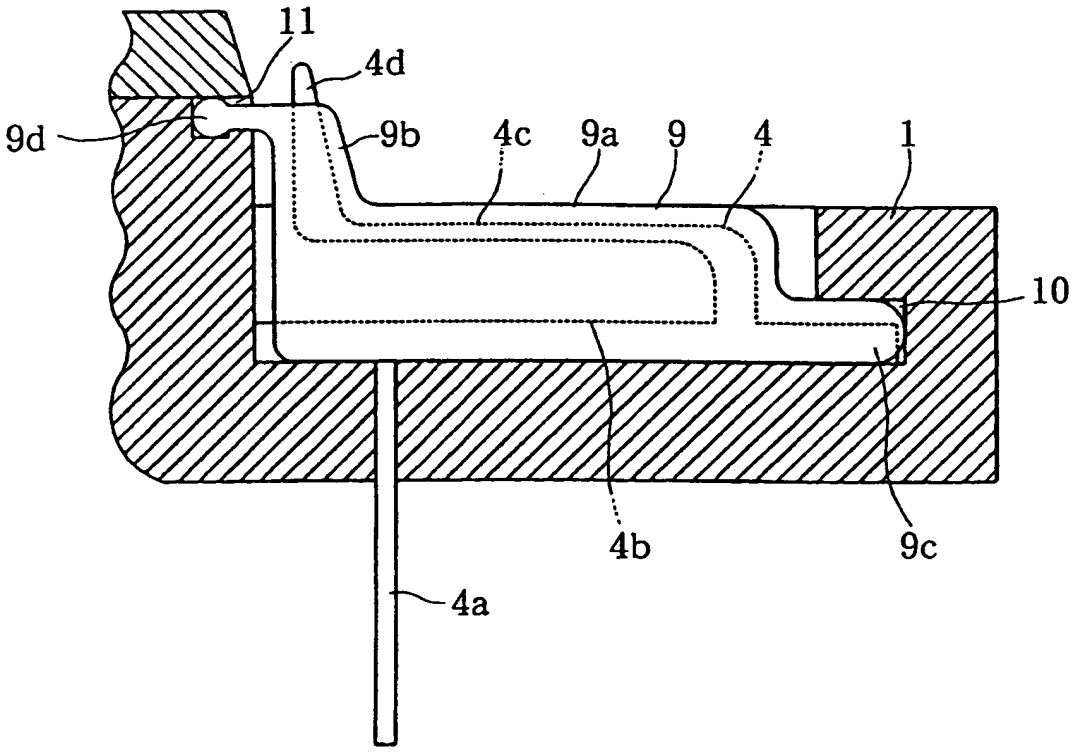


FIG.15

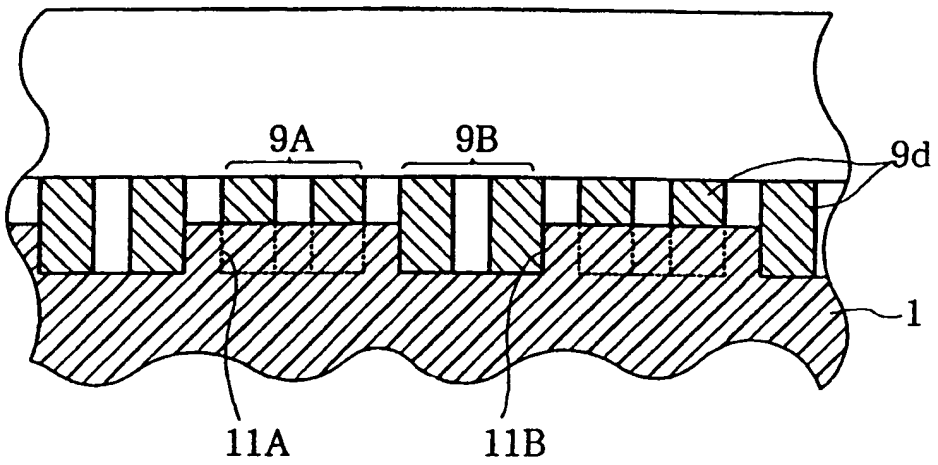
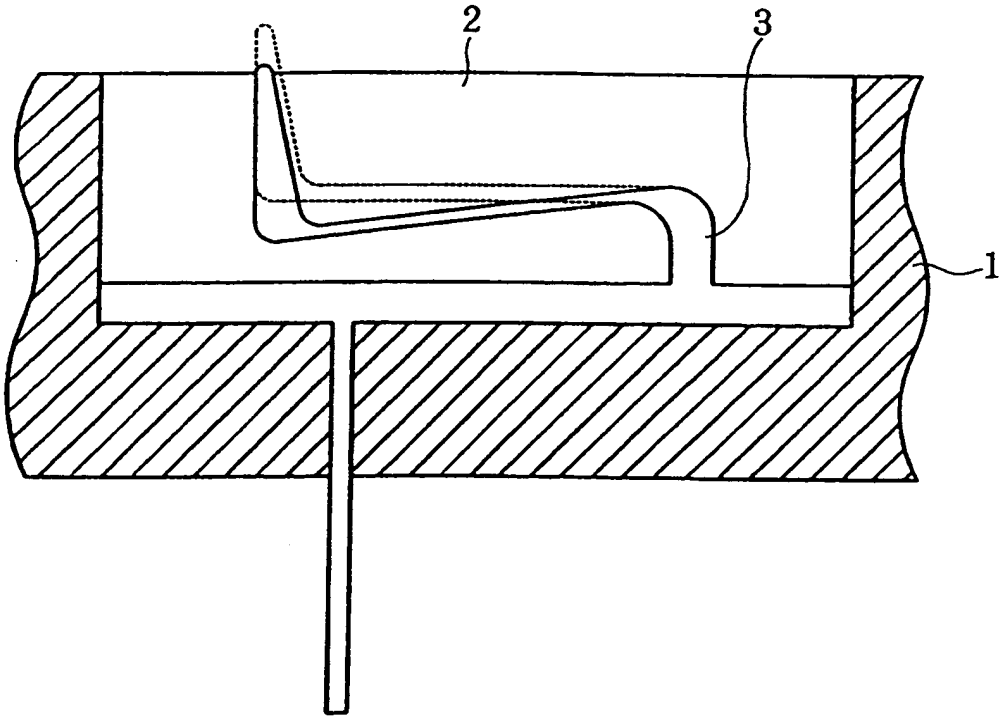


FIG.16

(PRIOR ART)



European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 30 3595

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	US-A-4 504 887 (BAKERMANS ET AL.) * column 2, line 39 - column 3, line 8; figures 1-4 *	1-3	H05K7/10 H01R23/72
A	DE-U-9 004 918 (MINNESOTA MINING & MFG. CO.,) * page 6, line 19 - page 7, line 9; figures 3,5,8 *	1-3	
A	FR-A-2 271 668 (ITT INDUSTRIES INC.,) * page 3, line 32 - page 4, line 5 *	1,4	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

H05K
H01R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	09 AUGUST 1992	HORAK A. L.

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